Sensitive Plants in the Sacramento River Conservation Area

SPECIES (COMMON NAME)	HABITAT	STATUS* FEDERAL/STATE/CNPS
Carex vulpinoidea (fox sedge)	wet places	—-/—-/2
Cryptantha crinita (Silky cryptantha)	sandy stream banks gravel bars	—-/—-/1B
Eleocharis quadrangulata (four-angled spikerush)	marshy areas	—-/—-/2
Hibiscus lasiocarpus (rose mallow)	marshy areas, old river channels	—-/—-/2
Sagittaria sandfordii (Sandford's arrowhead)	ponds, ditches	—-/—-/1B

***STATUS:**

Federal Listing

(February 28, 1996 Candidate Notice of Review)
FE/FT/FPT+FPE Federal listed endangered, threatened; proposed for listing

State Listing

SR/—/SE State listed rare, or endangered

CNPS – California Native Plant Society Listing

1B Rare, threatened or endangered throughout its range
2 Rare, threatened or endangered in California, but more common elsewhere

Wildlife Species in the Sacramento River Conservation Area

Part 1: Mammals

COMMON NAME	SCIENTIFIC NAME	STATUS
Marsupialia (oppossums)		
Virginia oppossum	*Didelphis virginiana*	
Insectivora (shrews and moles)		
Broad-footed mole	*Scapanus latimanus*	
Ornate shrew	*Sorex ornatus*	
Chiroptera (bats)		
Big brown bat	*Eptesicus fuscus*	
Brazilian free-tailed bat	*Tadarida brasiliensis*	
California myotis	*Myotis californicus*	
Hoary bat	*Lasiurus cinereus*	
Pallid bat	*Antrozous pallidus*	CSSC
Red bat	*Lasiurus borealis*	
Townsend's big-eared bat	*Plecotus townsendii*	FSC, CSSC
Western pipistrelle	*Pipistrellus Hesperus*	FSC
Yuma myotis	*Myotis yumanensis*	
Lagomorpha (rabbits and hares)		
Black-tailed hare	*Lepus californicus*	
Brush rabbit	*Sylvilagus bachmani*	
Desert cottontail	*Sylvilagus audubonii*	
Rodentia (rodents*)		
Beaver	*Castor canadensis*	
Black rat	*Rattus rattus*	I
Botta's pocket gopher	*Thomomys bottae*	
Brush mouse	*Peromyscus boylii*	
California ground squirrel	*Spermophilus beecheyi*	
California kangaroo rat	*Dipodomys californicus*	FSC, CSSC
California vole	*Microtus californicus*	
Deer mouse	*Peromyscus maniculatus*	
Dusky-footed woodrat	*Neotoma fuscipes*	
Fox squirrel	*Sciurus niger*	
Gray squirrel	*Sciurus carolinensis*	
House mouse	*Mus musculus*	I

Muskrat	*Ondatra zibethicus*	
Norway rat	*Rattus norvegicus*	I
Porcupine	*Erethizon dorsatum*	
Pinyon mouse	*Peromyscus truei*	
Western gray squirrel	*Sciurus griseus*	
Western harvest mouse	*Reithrodontomys megalotis*	
Carnivora (carnivores)		
Badger	*Taxidea taxus*	W
Bobcat	*Linx rufi*s	
Coyote	*Canis latrans*	
Feral house cat	*Felis cattus*	I
Golden grizzly bear	*Ursus horribilis californicus*	Extinct
Gray fox	*Urocyon cinereoargenteus*	
Long-tailed weasel	*Mustela frenata*	
Mink	*Mustela vison*	
Mountain lion	*Felis concolor*	
Raccoon	*Procyon lotor*	
Red fox	*Vulpes vulpes*	I
Ringtail	*Bassariscus astutus*	
River otter	*Lutra canadensis*	
Striped skunk Mephitis	*mephitis*	
Western spotted skunk	*Spilogale gracilis*	
Artiodactyla (hoofed mammals)		
Mule deer	*Odocoileus hemionus*	
Pronghorn	*Antilocapra americana*	Extirpated, reintroduced
Tule elk	*Cervus elaphanus nannode*	Extirpated, reintroduced
Wild pig	*Sus scrofa*	I

Part 2*:* Amphibians

COMMON NAME	SCIENTIFIC NAME	STATUS
Caudata (salamanders)		
California slender salamander	*Batrachoseps attenuatus*	
Long-toed salamander	*Ambystoma macrodactylum*	
Tiger salamander	*Ambystoma tigr*inum	CSSC, FC
Salientia (frogs and toads)		
Bullfrog	*Rana catesbeiana*	I
Foothill yellow-legged frog	*Rana boylei*	FSC, CSSC
Pacific treefrog	*Hyla regilla*	
Red-legged frog	*Rana aurora*	Extirpated, FT, CSSC
Western spadefoot	*Scaphiopus hammondi*	FSC, CSSC
Western toad	*Bufo boreas*	

Part 3: Reptiles

COMMON NAME	SCIENTIFIC NAME	STATUS
Emydidae (turtles)		
Western pond turtle	*Clemmys marmorata*	FSC, CSSC
Iguanidae (iguanid lizards)		
Coast horned lizard	*Phrynosoma coronatum*	FSC, CSSC
Western fence lizard	*Sceloporus occidentalis*	
Sagebrush lizard	*Sceloporus graciosus*	
Scincidae (skinks)		
Gilbert's skink	*Eurmeces gilberti*	
Western skink	*Eumeces skiltonianus*	
Teiidae (whiptale lizards)		
Western whiptail	*Cnemidophorus tigris*	
Anguidae (alligator lizards)		
Southern alligator lizard	*Gerrhonotus multicarinatus*	
Colubridae (Colubrid snakes)		
California mountain king	*Lampropeltis zonata*	
Striped racer	*Masticophis lateralis*	
Coachwhip	*Masticophis flagellum*	
Common garter snake	*Thamnophis sirtalis*	
Common kingsnake	*Lampropeltis getulus*	
Giant garter snake	*Thamnophis couchi gigas*	ST, FT
Gopher snake	*Pituophis melanoleucus*	
Night snake	*Hypsiglena torquata*	
Racer	*Coluber constrictor*	
Ringneck snake	*Diadophis punctatus*	
Sharp-tailed snake	*Contia tenius*	
Western aquatic garter snake	*Thamnophis couchi*	
Western terrestrial garter snake	*Thamnophis elegans*	
Viperidae (vipers)		
Western rattlesnake	*Crotalis viridis*	

Part 4: Birds

COMMON NAME	SCIENTIFIC NAME	STATUS
Gaviiformes (loons)		
Common loon	Gavia immer	CSSC, MNMBC
Podicipediformes (grebes)		
Clark's grebe	Aechmophorus clarkii	W
Eared grebe	Podiceps nigricollis	
Pied-billed grebe	Podilymbus podiceps	
Western grebe	Aechmophorus occidentalis	W
Pelicaniformes (pelicans and cormorants)		
American white pelican	Pelecanus erythrorhynchos	CSSC
Double-crested cormorant	Phalacrocorax auritus	CSSC

Anseriformes (ducks, geese, and swans)

American wigeon	*Anas americana*	
Barrow's goldeneye	*Bucephala islandica*	CSSC
Blue-winged teal	*Anas discors*	
Bufflehead	*Bucephala albeola*	
Canada goose	*Branta Canadensis*	FT
Canvasback	*Aythya valisineria*	
Cinnamon teal	*Anas cyanoptera*	
Common goldeneye	*Bucephala clangula*	
Common merganser	*Mergus merganser*	
Eurasian wigeon	*Anas penelope*	
Gadwall	*Anas strepera*	
Greater white-fronted goose	*Anser albifrons*	
Green-winged teal	*Anas crecca*	
Hooded merganser	*Lophodytes cucullatus*	
Lesser scaup	*Aythya affinis*	
Mallard	*Anas platyrhynchos*	
Northern shoveler	*Anas clypeata*	
Northern pintail	*Anas acuta*	
Redhead	*Aythya americana*	
Ring-necked duck	*Aythya collaris*	
Ross's goose	*Chen rossii*	
Ruddy duck	*Oxyura jamaicensis*	
Snow goose Chen	*caerulescens*	
Tundra swan	*Cygnus columbianus*	
Wood duck	*Aix sponsa*	

Falconiformes (vultures, hawks, eagles, and falcons)

American kestrel	*Falco sparverius*	
Bald eagle	*Haliaeetus leucocephalus*	FT, SE
California condor	*Gymnogyps californianus*	Extirpated - reintroduced
Cooper's hawk	*Accipiter cooperii*	CSSC
Ferruginous hawk	*Buteo regalis*	FSC, CSSC
Golden eagle	*Aquila chrysaetos*	CSSC
Merlin	*Falco columbarius*	CSSC
Northern harrier	*Circus cyaneus*	CSSC
Osprey	*Pandion haliaetus*	CSSC
Peregrine falcon	*Falco peregrinus*	SE, MNBMC
Prairie falcon	*Falco mexicanus*	CSSC
Red-shouldered hawk	*Buteo lineatus*	
Red-tailed hawk	*Buteo jamaicensis*	
Rough-legged hawk	*Buteo lagopus*	
Sharp-shinned hawk	*Accipiter striatus*	CSSC
Swainson's hawk	*Buteo swainsoni*	ST
Turkey vulture	*Cathartes aura*	
Black-shouldered kite kite	*Elanus leucurus*	W, MNBMC

Galliformes (turkeys, grouse, quail, and pheasants)

California quail	*Callipepla californica*	
Ring-necked pheasant	*Phasianus* colchicus	I
Wild turkey	*Meleagris gallopavo*	I

Ciconiiformes (herons and egrets)		
American bittern	*Botaurus lentiginosus*	MNBNC
Black-crowned night heron	*Nycticorax nycticorax*	W
Cattle egret	*Bubulcus ibis I*	
Great egret	*Casmerodius albus*	W
Great-blue heron	*Ardea herodias*	W
Green-backed heron	*Butorides striatus*	
Snowy egret	*Egretta thula*	W
Western *least bittern*	*Ixobrychus exilis*	FSC, CSSC
White-faced ibis	*Plegadis chihi*	FSC, CSSC
Gruiformes (cranes and rails)		
American coot	*Fulica americana*	
Common moorhen	*Gallinula chloropus*	
Sandhill crane	*Grus canadensis*	ST
Sora	*Porzana carolina*	
Virginia rail	*Rallus limicola*	
Charadriiformes (shorebirds and gulls)		
American avocet	*Recurvirostra americana*	
Black tern	*Chlidonias niger*	FSC, CSSC
Black-bellied plover	*Pluvialis squatarola*	
Black-necked stilt	*Himantopus mexicanus*	
Bonaparte's gull	*Larus philadelphia*	
California gull	*Larus californicus*	CSSC
Common snipe	*Gallinago gallinago*	
Dunlin	*Calidris alpina*	
Forster's tern	*Sterna forsteri*	W
Greater yellowlegs	*Tringa melanoleuca*	
Herring gull	*Larus argentatus*	
Killdeer	*Charadrius vociferus*	
Least sandpiper	*Calidris minutilla*	
Lesser yellowlegs	*Tringa flavipes*	
Long-billed curlew	*Numenius americanus*	CSSC, MNBNC
Long-billed dowitcher	*Limnodromus scolopaceus*	
Mew gull	*Larus canus*	
Mountain plover	*Charadrius montanus*	FC, CSSC
Red-necked phalarope	*Phalaropus lobatus*	
Ring-biled gull	*Larus delawarensis*	
Short-billed dowitcher	*Limnodromus griseus*	
Solitary sandpiper	*Tringa solitaria*	
Spotted sandpiper	*Actitis macularia*	
Western sandpiper	*Calidris mauri*	
Western snowy plover	*Charadrius alexandrinus nivosus*	CSSC, MNBNC
Wilson's phalarope	*Phalaropus tricolor*	
Columbiformes (pigeons and doves)		
Band-tailed pigeon	*Columba fasciata*	
Mourning dove	*Zenaida macroura*	
Cuculiformes (cuckoos and roadrunners)		
Roadrunner	*Geococcyx californianus*	
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	SE

Strigiformes (owls)		
Barn owl	*Tyto alba*	
Burrowing owl	*Athene cunicularia*	FSC, CSSC
Great horned owl	*Bubo virginianus*	
Long-eared owl	*Asio otus*	CSSC
Northern pygmy owl	*Glaucidium gnoma*	
Short-eared owl	*Asio flammeus*	CSSC, MNBMC
Western screech owl	*Otus kennicottii*	
Caprimulgiformes (goatsuckers and nighthawks)		
Common nighthawk	*Chordeiles minor*	
Common poorwill	*Phalaenoptilus nuttallii*	
Lesser nighthawk	*Chordeiles acutipennis*	
Apodiformes (swifts and hummingbirds)		
Anna's hummingbird	*Calypte anna*	
Black-chinned hummingbird	*Archilochus alexandri*	
Calliope hummingbird	*Stellula calliope*	
Rufous hummingbird	*Selasphorus rufus*	MNBMC
Vaux's swift	*Chaetura vauxi*	CSSC, MNBMC
Coraciiformes (kingfishers)		
Belted king fisher	*Ceryle alcyon*	
Piciformes (woodpeckers)		
Acorn woodpecker	*Melanerpes formicivorous*	
Downy woodpecker	*Picoides pubescens*	
Hairy woodpecker	*Picoides villosus*	
Lewis' woodpecker	*Melanerpes lewis*	
Northern flicker	*Colaptes auratus*	
Nuttall's woodpecker	*Picoides nuttallii*	
Red-breasted sapsucker	*Sphyrapicus ruber*	
Passeriformes		
American crow	*Corvus brachyrhynchos*	
American dipper	*Cinclus mexicanus*	
American goldfinch	*Carduelis tristis*	
American pipit	*Anthus rubescens*	
American robin	*Turdus migratorius*	
Ash-throated flycatcher	*Myiarchus cinerascens*	
Bank swallow	*Riparia riparia*	ST
Barn swallow	*Hirundo rustica*	
Bewick's wren	*Thryomanes bewickii*	
Black phoebe	*Sayornis nigricans*	
Black-headed grosbeak	*Pheucticus melanocephalus*	
Black-throated grey warble	*Dendroica nigrescens*	
Blue grosbeak	*Guiraca caerulea*	
Blue-grey gnatcatcher	*Polioptila caerulea*	
Brewer's blackbird	*Euphagus cyanocephalus*	
Brown creeper	*Certhia americana*	
Brown-headed cowbird	*Molothurus ater*	
Brown towhee	*Pipilo fuscus*	
Bushtit	*Psaltriparus minimus*	
California horned lark	*Eremophila alpestris*	CSSC

California thrasher	*Toxostoma redivivum*	
Cedar waxwing	*Bombycilla cedrorum*	
Chipping sparrow	*Spizella passerina*	
Cliff swallow	*Hirundo pyrrhonota*	
Common raven	*Corvus corax*	
Common yellowthroat	*Geothlypis trichas*	
Dark-eyed junco	*Junco hyemalis*	
Dusky flycatcher	*Empidonax oberholseri*	
European starling	*Sturnus vulgaris*	I
Evening grosbeak	*Coccothraustes vespertinus*	
Fox sparrow	*Passerella iliaca*	
Golden-crowned kinglet	*Regulus satrapa*	
Golden-crowned sparrow	*Zonotrichia atricapilla*	
Hammond's flycatcher	*Empidonax hammondii*	
Hermit thrush	*Catharus guttatus*	MNBMC
Hermit warbler	*Dendroica occidentalis*	
Hooded oriole	*Icterus cucullatus*	
House finch	*Carpodacus mexicanus*	
House sparrow	*Passer domesticus*	I
House wren	*Troglodytes aedon*	
Hutton's vireo	*Vireo huttoni*	
Lark sparrow	*Chondestes grammacus*	MNBMC
Lawrence's goldfinch	*Carduelis lawrencei*	MNBMC
Luzuli bunting	*Passerina amoena*	
Least Bell's vireo	*Vireo bellii pusillus*	FE, SE
Lesser goldfinch	*Carduelis psaltria*	
Lincoln's sparrow	*Melospiza lincolnii*	
Loggerhead shrike	*Lanius ludovicianus*	FSC,CSSC
MacGillivray's warbler	*Oporornis tolmiei*	
Marsh wren	*Cistothorus palustris*	
Mountain bluebird	*Sialia currucoides*	
Mountain chickadee	*Parus gambeli*	
Nashville warbler	*Vermivora ruficapilla*	
Northern mockingbird	*Mimus polyglottos*	
Northern oriole	*Icterus galbula*	
Northern rough-winged swallow	*Stelgidopteryx serripennis*	
Northern shrike	*Lanius excubitor*	
Northern waterthrush	*Seiurus noveboracensis*	
Oak titmouse	*Parus inornatus*	
Orange-crowned warbler	*Vermivora celata*	
Pacific-slope flycatcher	*Empidonax difficilis*	
Pine sisken	*Carduelis pinus*	
Purple finch	*Carpodacus purpureus*	
Purple martin	*Progne subis*	CSSC
Red-breasted nuthatch	*Sitta canadensis*	
Red-winged blackbird	*Agelaius phoeniceus*	
Ruby-crowned kinglet	*Regulus calendula*	
Rufous-sided towhee	*Pipilo erythrophthalmus*	
Savannah sparrow	*Passerculus sandwichensis*	
Say's phoebe	Sayornis say*a*	

Scrub jay	*Aphelocoma coerulescens*	
Solitary vireo	*Vireo solitarius*	
Song sparrow	*Melospiza melodia*	
Stellar's jay	*Cyanocitta stelleri*	
Swainson's thrush	*Catharus ustulatus*	
Townsend's warbler	*Dendroica towsendi*	
Tree swallow	*Tachycineta bicolor*	
Tri-colored blackbird	*Agelaius tricolor*	FSC, CSSC
Varied thrush	*Ixoreus naevius*	
Violet-green swallow	*Tachycineta thalassina*	
Warbling vireo	*Vireo gilvus*	
Western bluebird	*Sialia mexicana*	
Western kingbird	*Tyrannus verticalis*	
Western meadowlark	*Sturnells neglecta*	
Western tanager	*Piranga ludoviciana*	
Western wood pewee	*Contopus sordidulus*	
White-breasted nuthatch	*Sitta carolinensis*	
White-crowned sparrow	*Zonotrichia leucophrys*	
White-throated sparrow	*Zonotrichia albicollis*	
Willow flycatcher	*Empidonax traillii**	SE
Wilson's warbler	*Wilsonia pusilla*	
Winter wren	*Troglodytes troglodytes*	
Yellow rumped warbler	*Dendroica coronata*	
Yellow warbler	*Dendroica petechia*	CSSC
Yellow-billed magpie	*Pica nuttalli*	
Yellow-breasted chat	*Icteria virens*	CSSC
Yellow-headed blackbird	*Xanthocephalus xanthocephalus*	

Part 5: Fish

COMMON NAME	SCIENTIFIC NAME	STATUS
Acipenseridae (sturgeon)		
Green sturgeon	*Acipenser medirostris*	CSSC
White sturgeon	*Acipenser transmontanus*	
Petromyzontidae (lamprey)		
Pacific brook lamprey	*Lampetra pacifica*	
Pacific lamprey	*Lampetra tridentata*	
River lamprey	*Lampetra ayresi*	
Clupeidae (herring)		
American shad	*Alosa sapidissima*	I
Threadfin shad	*Dorosoma petenense*	I
Salmonidae (salmon and trout)		
Brown trout	*Salmo trutta*	I
Chinook salmon, fall-run	*Oncorhynchus tshawytscha*	
Chinook salmon, late fall-run	*Oncorhynchus tshawytscha*	
Chinook salmon, winter-run	*Oncorhynchus tshawytscha*	SE, FE
Chinook salmon, spring-run	*Oncorhynchus tshawytscha*	CC
Chum salmon	*Oncorhynchus keta*	
Coho salmon	*Oncorhynchus kisutch*	FT

Pink salmon	*Oncorhynchus gorbuscha*	
Sockeye salmon	*Oncorhynchus nerka*	
Steelhead trout	*Oncorhynchus mykiss*	CSSC, FT
Cyprinidae (minnow)		
Blackfish	*Orthodon microlepidotus*	
California roach	*Hesperoleucus symmetricus*	
Carp	*Cyprinus carpio*	I
Fathead minnow	*Pimephales promelas*	I
Golden shiner	*Notemigonus crysoleucas*	I
Goldfish	*Carassius auratus*	I
Hardhead	*Mylopharodon conocephalus*	
Hitch	*Lavinia exilicauda*	
Lahontan redside	*Richardsonius egregious*	I
Sacramento splittail	*Pogonichthys macrolepidotus*	FT
Sacramento squawfish	*Ptychocheilus grandis*	
Speckled dace	*Rhinichthys osculus*	
Thicktail chub	*Gila crassicauda*	Extinct
Tui chub	*Gila bicolor*	
Catostomidae (sucker)		
Sacramento sucker	*Catostomus occidentalis*	
Ictaluridae (catfish)		
Black bullhead	*Ictalurus melas*	I
Brown bullhead	*Ictalurus nebulosus*	I
Channel catfish	*Ictalurus punctatus*	I
White catfish	*Ictalurus catus*	I
Yellow bullhead	*Ictalurus natalis*	I
Poeciliidae (livebearer)		
Mosquitofish	*Gambusia affinis*	I
Atherinidae (silverside)		
Mississippi silverside	*Menidia audens*	I
Gasterosteidae (stickleback)		
Threespine stickleback	*Gasterosteus aculeatus*	
Percichthyidae (temperate basses)		
Striped bass	*Morone saxatilis*	I
Centrarchidae (sunfish)		
Black crappie	*Pomoxis nigromaculatus*	I
Bluegill	*Lepomis macrochirus*	I
Green sunfish	*Lepomis cyanellus*	I
Largemouth bass	*Micropterus salmoides*	I
Pumpkinseed	*Lepomis gibbosus*	
Redear sunfish	*Lepomis microlophus*	I
Sacramento perch	*Archoplites interruptus*	
Smallmouth bass	*Micropterus dolomieui*	I
Spotted bass	*Micropterus punctulatus*	I
Warmouth	*Lepomis gulosus*	I
White crappie	*Pomoxis annularis*	I

Percidae (perch)		
Bigscale logperch	*Percina macrolepida*	I
Embiotocidae (surfperch)		
Tule perch	*Hysterocarpus traski*	
Cottidae (sculpin)		
Prickly sculpin	*Cottus asper*	
Riffle sculpin	*Cottus gulosus*	
Staghorn sculpin	*Leptocottus armatus*	

Legal Status Key

Federal Endangered	FE
State Endangered	SE
Federal Threatened	FT
Federal Species of Concern	FSC
Federal Migratory Non-game Bird of Management Concern	MNBMC
Federal Candidate	FC
State Threatened	ST
California Species of Special Concern	CSSC
California Candidate	CC
Watch	W
Extinct	Extinct
Extirpated	Extirpated
Introduced	I

Part 6: Invertebrates (special status only)

COMMON NAME	SCIENTIFIC NAME	STATUS
Coleoptera		
Valley elderberry longhorn beetle	*Desmocerus californicus ssp. diamorphus*	FT

Sacramento River Geographic Information System

The Sacramento River Geographic Information System was developed by the California Department of Water Resources in cooperation with the Senate Bill 1086 Advisory Council.

Its primary purpose is to assist with carrying out the objective of the Upper Sacramento River Fisheries and Riparian Habitat Management Plan, which is to reestablish a continuous riparian ecosystem along the Sacramento River between Keswick and Verona. It is intended to help with locally based decision-making, assisting both scientists and laypeople in understanding and analyzing land use and vegetation patterns, flooding, erosion, and channel dynamics on the river.

SUBJECT	DESCRIPTION
Alluvial deposition, active	Active alluvial deposition, as mapped by Halley and Harwood (1985)
Alluvial deposition, recent	Recent alluvial deposition, as mapped by Halley and Harwood (1985)
Bank protection	U.S. Army Corps of Engineers (COE) bank protection and levees, as mapped in 1991 COE Atlas
Bank swallow sites	Location and number of bank swallow burrows (1994)
California Natural Diversity Database	California Natural Diversity Database (CNDDB)
Channel locations	River channel, selected years between 1896 and 1991
Counties	County boundaries: Siskiyou, Lassen, Del Norte, Lake Mendocino, Humboldt, Shasta, Tehama, Glenn, Colusa, Butte, Sutter, Yolo, Sacramento, San Joaquin, part of Placer, Yuba
Districts: Irrigation, Water and Reclamation	Irrigation, Water and Reclamation Districts within the Sacramento River Conservation Area
Erosion	Erosion projections developed by Koll Buer, 25 and 50 years, with and without riprap (1991)
Flooding, Recurrence Interval Models	Generalized inundation scenarios for various recurrence intervals
Floodline	100-year floodline

SUBJECT	DESCRIPTION
Geology	Surface geology, mapped by Harwood & Halley, revised by Koll Buer
Growth Projections	Growth projections for northern Sacramento Valley (Radabaugh)
Land Use	Land use data developed by Department of Water Resources
Levees	Private levees (1978)
Meanderbelt, 50 year	U.S. Army Corps of Engineers' 50-year meander belt (1981)
Meanderbelt, 150 year, (inner river zone guideline)	100-year meanderbelt plus 50-year erosion projections
Meanderbelt, 100 year	Aggregate river channels, 1896-1991
Ownership	Property ownership (1995)
Planning boundary	Proposed Sacramento River Conservation Area
Political districts	State and federal political districts
Precipitation	Precipitation isohyets
Quadrangle sheets	USGS 7.5' quad boundaries and names
Reaches	Four broad reaches between Keswick Dam and Verona
Section lines	Section lines
Seepage areas	High risk seepage areas (Priestaff)
Soils	Soils as mapped by Soil Conservation Service
Vegetation, bank	Bank mapping (1995)
Vegetation, bank	Bank mapping (1996)
Vegetation, flood protection	Riparian vegetation sites important for flood control (MBK sites)
Vegetation, 1952	Riparian vegetation (1952), mapped by McGill
Vegetation, 1987	Riparian vegetation (1987), mapped by McGill
Vegetation, since 1994	Riparian vegetation, mapped by CSU Chico
Water Diversions	Draft agricultural water diversion data (1994), from California Department of Fish and Game, Inland Fisheries Division
Watersheds	Surface water basins

SUMMARY OF ACREAGE TABULATIONS

Part 1. Land Use.

Keswick - Red Bluff Reach

LAND USE CATEGORY	INNER RIVER ZONE GUIDELINE		CONSERVATION AREA	
	Acres	% of Land Surface Area	Acres	% of Land Surface Area
Agriculture	1,334	17%	6,459	35%
Riparian Vegetation	1,490	19%	2,191*	12%*
Upland Vegetation	3,274	41%	6,210*	34%
Urban	852	11%	2,188	12%
Water Surface (excluding main channel)	372	5%	644	3%
Miscellaneous (includes barren wasteland)	643	8%	767	4%
Total Land Surface Area	**7,965**	**101%**	**18,459**	**100%**
Channel Surface Area	3,005		3,005	
Total	**10,970**		**21,464**	

*The purpose of DWR land use surveys is to map agricultural crops. **Refer to Appendix D Part 2 for the most accurate riparian vegetation data.** Land use data based on DWR agricultural land use surveys of Shasta, Tehama, Butte, Glenn, Colusa, Sutter, and Yolo Counties (see References). Percentages may not be equal to 100 due to rounding.

Red Bluff - Chico Landing Reach

LAND USE CATEGORY	INNER RIVER ZONE GUIDELINE		CONSERVATION AREA	
	Acres	% of Land Surface Area	Acres	% of Land Surface Area
Agriculture	4,854	30%	18,300	53%
Riparian Vegetation	5,662*	35%*	6,864*	20%
Upland Vegetation	2,973*	18%*	5,250*	15%
Water Surface (excluding main channel)	696	4%	695	2%
Miscellaneous (includes barren wasteland)	1,787	11%	1,932	6%
Urban	321	2%	1,301	4%
Total Land Surface Area	**16,293**	**100%**	**34,342**	
Channel Surface Area	2,896		2,896	
Total	**19,189**		**37,238**	

*The purpose of DWR land use surveys is to map agricultural crops. **Refer to Appendix D Part 2 for the most accurate riparian vegetation data.** Land use data based on DWR agricultural land use surveys of Shasta, Tehama, Butte, Glenn, Colusa, Sutter, and Yolo Counties (see References). Percentages may not be equal to 100 due to rounding.

Part 1. Land Use.

Chico Landing - Colusa Reach

LAND USE CATEGORY	INNER RIVER ZONE GUIDELINE		CONSERVATION AREA	
	Acres	% of Land Surface Area	Acres	% of Land Surface Area
Agriculture	1,946	16%	1,946	16%
Riparian Vegetation	5,944	48%	5,944	48%
Upland Vegetation	1,374	11%	1,374	11%
Water Surface (excluding main channel)	275	2%	275	2%
Urban	1,371	11%	1,371	11%
Miscellaneous (includes barren wasteland)	1,583	13%	1,583	13%
Total Land Surface Area	**12,493**	**101%**	**12,493**	**101%**
Channel Surface Area	2,832		2,832	
Total	**15,325**		**15,325**	

*The purpose of DWR land use surveys is to map agricultural crops. **Refer to Appendix D Part 2 for more accurate riparian vegetation data.** Land use data based on DWR agricultural land use surveys of Shasta, Tehama, Butte, Glenn, Colusa, Sutter, and Yolo Counties (see References). Percentages may not be equal to 100 due to rounding.

Colusa - Verona Reach

LAND USE CATEGORY	INNER RIVER ZONE GUIDELINE		CONSERVATION AREA	
	Acres	% of Land Surface Area	Acres	% of Land Surface Area
Agriculture	645	23%	645	23%
Riparian Vegetation	1,113	40%	1,113	40%
Upland Vegetation	589	21%	589	21%
Urban	411	15%	411	15%
Water Surface (excluding main channel)	3	<1%	3	<1%
Miscellaneous (includes barren wasteland)	3	<1%	3	< 1%
Total Land Surface Area	**2,764**	**100%**	**2,764**	**100%**
Channel Surface Area	1,891		1,891	
Total	**4,655**		**4,655**	

*The purpose of DWR land use surveys is to map agricultural crops. **Refer to Appendix D Part 2 for more accurate riparian vegetation data.** Land use data based on DWR agricultural land use surveys of Shasta, Tehama, Butte, Glenn, Colusa, Sutter, and Yolo Counties (see References). Percentages may not be equal to 100 due to rounding.

Part 2. Riparian Vegetation.

Keswick-Red Bluff Reach

VEGETATION TYPE	INNER RIVER ZONE GUIDELINE		CONSERVATION AREA	
	Acres	% of Land Surface Area	Acres	% of Land Surface Area
Riparian Forests	2,022	25%	2,801	15%
Riparian Scrub	1,101	14%	1,439	8%
Valley Oak Woodland	218	3%	315	2%
Marsh	49	<1%	58	<1%
Blackberry Scrub	37	<1%	61	<1%
Total Riparian Vegetation	**3,427**	**43%**	**4,674**	**25%**
Total Land Surface Area	7,984		18,474	
Channel Surface Area	3,005		3,005	
Total	**10,989**		**21,479**	

GIC(1997;2000). Percentages may not total due to rounding.

Red Bluff - Chico Landing Reach

VEGETATION TYPE	INNER RIVER ZONE GUIDELINE		CONSERVATION AREA	
	Acres	% of Land Surface Area	Acres	% of Land Surface Area
Riparian Forests	4,417	27%	5,154	15%
Riparian Scrub	3,630	22%	3,929	12%
Valley Oak Woodland	44	<1%	115	<1%
Marsh	97	<1%	141	<1%
Blackberry Scrub	13	<1%	46	<1%
Total Riparian Vegetation	**8,201**	**50%**	**9,385**	**27%**
Total Land Surface Area	15,904		34,107	
Channel Surface Area	2,896		2,896	
Total	**18,800**		**37,003**	

GIC (1997; 2000). Percentages may not total due to rounding.

Part 2. Riparian Vegetation.

Chico Landing-Colusa Reach

VEGETATION TYPE	INNER RIVER ZONE GUIDELINE		CONSERVATION AREA	
	Acres	% of Land Surface Area	Acres	% of Land Surface Area
Riparian Forests	4,621	42%	4,621	42%
Riparian Scrub	3,276	30%	3,276	30%
Valley Oak Woodland	20	<1%	20	<1%
Marsh	83	<1%	83	<1%
Blackberry Scrub	11	<1%	11	<1%
Total Riparian Vegetation	**8,011**	**72%**	**8,011**	**72%**
Total Land Surface Area	11,072		11,072	
Channel Surface Area	2,832		2,832	
Total	**13,904**		**13,904**	

GIC (1997; 2000). Percentages may not total due to rounding.

Colusa-Verona Reach

VEGETATION TYPE	INNER RIVER ZONE GUIDELINE		CONSERVATION AREA	
	Acres	% of Land Surface Area	Acres	% of Land Surface Area
Riparian Forests	1,149	41%	1,149	41%
Riparian Scrub	176	6%	176	6%
Valley Oak Woodland	0	0%	0	0%
Marsh	6	<1%	6	<1%
Blackberry Scrub	4	<1%	4	<1%
Total Riparian Vegetation	**1,335**	**47%**	**1,335**	**47%**
Total Land Surface Area	2,816		2,816	
Channel Surface Area	1,891		1,891	
Total	**4,707**		**4,707**	

GIC (1997; 2000). Percentages may not total due to rounding

Part 3. Ownership.

Keswick-Red Bluff Reach

OWNERSHIP CATEGORY	INNER RIVER ZONE GUIDELINE		CONSERVATION AREA	
	Acres	% of Land Surface Area	Acres	% of Land Surface Area
Private	5,799	73%	15,067	82%
Public				
Federal	786	10%	1,556	8%
State	551	7%	945	5%
Local District, City, County	848	11%	906	5%
Total (Land Surface Area)	**7,984**	**101%**	**18,474**	**100%**
Channel Surface Area	3,005		3,005	
Total:	**10,989**		**21,479**	

DWR Sacramento River GIS (May 1994);DPR (1994). Rounded to nearest 100 acres.

Red Bluff-Chico Landing Reach

OWNERSHIP CATEGORY	INNER RIVER ZONE GUIDELINE		CONSERVATION AREA	
	Acres	% of Land Surface Area	Acres	% of Land Surface Area
Private	9,458	59%	25,309	74%
Public				
Federal	3,429	22%	5,327	16%
State	2,759	17%	3,201	9%
Local District, City, County	258	2%	270	<1%
Total (Land Surface Area):	**15,904**	**100%**	**34,107**	**100%**
Channel Surface Area	2,896		2,896	
Total	**18,800**		**37,003**	

DWR Sacramento River GIS (May 2000); DPR (1994). Rounded to nearest 100 acres.

Part 3. Ownership.

Chico Landing-Colusa Reach

OWNERSHIP CATEGORY	INNER RIVER ZONE GUIDELINE		CONSERVATION AREA	
Area	Acres	% of Land Surface Area	Acres	% of Land Surface
Private	7,437	67%	7,437	67%
Public				
Federal	1,092	10%	1,092	10%
State	2,523	23%	2,523	23%
Local District, City, County	20	<1%	20	<1%
Total (Land Surface Area):	**11,072**	**100%**	**11,072**	**100%**
Channel Surface Area	2,832		2,832	
Total	**13,904**		**13,904**	

DWR Sacramento River GIS (May 1994); DPR (1994); Conservation easement records kept by DWR. Rounded to nearest 100 acres.

Colusa - Verona Reach

OWNERSHIP CATEGORY	INNER RIVER ZONE GUIDELINE		CONSERVATION AREA	
	Acres	% of Land Surface Area	Acres	% of Land Surface Area
Private	2,754	98%	2,754	98%
Public				
Federal	0	0%	0	0%
State	53	2%	53	2%
Local District, City, County	9	<1%	9	<1%
Total (Land Surface Area):	**2,816**	**100%**	**2,816**	**100%**
Channel Surface Area	1,891		1,891	
Total	**4,707**		**4,707**	

DWR Sacramento River GIS (May 1994); DPR (1994); Conservation easement records kept by DWR. Rounded to nearest 100 acres.

Part 4. The Four Reaches

REACH	RIVER MILES	LENGTH	AREA WITHIN INNER RIVER ZONE GUIDELINE (acres)	AREA WITHIN CONSERVATION AREA (acres)
Keswick Dam-Red Bluff Diversion Dam	RM 302-RM 243	59 river miles	11,000	21,500
Red Bluff Diversion Dam-Chico Landing	RM 243-RM 193	50 river miles	18,800	37,000
Chico Landing-Colusa Bridge	RM 193-RM 144	49 river miles	14,000	14,000
Colusa Bridge-Verona[1]	RM 143-RM 79	64 river miles	4,700	4,700
Total:	**RM 302- RM 79**	**223 river miles**	**48,500 acres**	**77,200 acres**

Acres rounded to nearest 100.
[1] Confluence of the Feather River

SENATE BILL 1086 AND SENATE CONCURRENT RESOLUTION NO. 62

Senate Bill No. 1086

CHAPTER 885

An act to add Article 4.5 (commencing with Section 1385) to Chapter 4 of Division 2 of, and to add and repeal Chapter 4.5 (commencing with Section 1400) of Division 2 of, the Fish and Game Code, relating to the Upper Sacramento River Fisheries and Riparian Habitat, and making an appropriation therefor.

[Approved by Governor September 18, 1986. Filed with Secretary of State September 18, 1986.]

LEGISLATIVE COUNSEL'S DIGEST

SB 1086, Nielsen. Upper Sacramento River: fisheries and riparian habitat.

(1) Under the Wildlife Conservation Law of 1947, the Wildlife Conservation Board may authorize the Department of Fish and Game to acquire real property for the benefit of wildlife.

This bill would require the board by January 1, 1988, to inventory the lands along the upper Sacramento River, as described, to identify and determine the priority of those lands that are valuable to fish and wildlife. The bill would prescribe related matters.

(2) Existing law does not provide for an Upper Sacramento River Fisheries and Riparian Habitat Advisory Council.

This bill would create that council composed of specified members, and would require the advisory council to develop, for submission to the Legislature, the Upper Sacramento River Fisheries and Riparian Habitat Management Plan to provide for the protection, restoration, and enhancement of fish and riparian habitat and associated wildlife for the area between the Feather River and Keswick Dam. The bill would provide for an action team with specified members to develop proposed plan elements. The bill would specify related requirements for preparation of the management plan. The bill would require the advisory council to submit the management plan to the Legislature by January 1, 1989. These provisions of the bill would be repealed on January 1, 1989.

(3) The bill would appropriate $250,000 from the California Environmental License Plate Fund, with $150,000 to the Wildlife Conservation Board for the inventory and $100,000 to the Secretary of the Resources Agency for the preparation of the management plan.

Appropriation: yes.

The people of the State of California do enact as follows:

SECTION 1. Article 4.5 (commencing with Section 1385) is added to Chapter 4 of Division 2 of the Fish and Game Code, to read:

Article 4.5. Lands Inventory

1385. For the purposes of this article, "upper Sacramento River" means the Sacramento River upstream from the confluence with the Feather River and downstream from Keswick Dam.

1386. The board shall, not later than January 1, 1988, inventory, or cause to be inventoried, the lands along the upper Sacramento River to identify and determine the priority of those lands that are valuable to fish and wildlife. The inventory shall be conducted so as to provide information needed to make evaluations pursuant to this chapter.

1387. The inventory made under this article shall take special efforts to identify lands that provide any of the following:

(a) A source of salmon spawning gravels, or lands that are otherwise important to anadromous and resident fisheries.

(b) Habitat for rare, threatened, and endangered species.

(c) Riparian habitat or an opportunity for reestablishment of riparian habitat.

1388. The board shall also make a preliminary identification of potential willing sellers in the inventory made under this article.

SEC. 2. Chapter 4.5 (commencing with Section 1400) is added to Division 2 of the Fish and Game Code, to read:

CHAPTER 4.5. UPPER SACRAMENTO RIVER FISHERIES AND RIPARIAN HABITAT MANAGEMENT PLAN

1400. The Legislature hereby finds and declares as follows:

(a) The Sacramento River system has tremendous social, environmental, and economic value to the people of California for many consumptive and nonconsumptive beneficial purposes. The Sacramento River system provides water for agricultural, municipal, and industrial uses, and for hydroelectric power, recreation, and navigation.

(b) The Sacramento River system is the state's largest producer of salmon, striped bass, sturgeon, and shad. It is also a major source of steelhead and other game fish and the source of water for much of the migratory bird population of the Pacific Flyway. It is essential that these values be protected.

(c) Various human and natural causes have contributed to substantial reductions in various anadromous fish populations in the Sacramento River system.

(d) Lack of a comprehensive management plan for the Sacramento River Basin has resulted in independent actions that pit some beneficial uses of water against others, thereby causing strong competition among competing water users.

(e) A comprehensive Upper Sacramento River Fisheries and Riparian Habitat Management Plan is needed to develop

information to provide for the protection, enhancement, and restoration of fish and riparian habitat and associated wildlife, as part of the orderly development of the water resources of the Sacramento River Basin for all beneficial purposes.

1401. As used in the chapter:

(a) "Advisory council" means the Upper Sacramento River Fisheries and Riparian Habitat Advisory Council created pursuant to Section 1402.

(b) "Action team" means the Upper Sacramento River Fisheries and Riparian Habitat Action Team created pursuant to Section 1403.

(c) "Management plan" means the Upper Sacramento River Fisheries and Riparian Habitat Management Plan prepared pursuant to this chapter.

1402. The Upper Sacramento River Fisheries and Riparian Habitat Advisory Council is hereby created consisting of the following members:

(a) The Director of Fish and Game, the Director of Water Resources, a designee of the State Lands Commission, a designee of the Chairperson of the State Water Resources Control Board, a designee of the Wildlife Conservation Board, and a designee of the Chairperson of the State Reclamation Board.

(b) The Director of the Mid-Pacific Region of the United States Bureau of Reclamation; the Sacramento District Engineer for the United States Army Corps of Engineers; the Regional Director, Region 1, for the United States Fish and Wildlife Service; the Regional Forester, Region 5, for the United States Forest Service; the State Director, California State Office, United States Bureau of Land Management; and the Regional Director, Region 3, for the National Marine Fisheries Service; provided that the foregoing federal officials agree to serve on the advisory council.

(c) One member of the board of supervisors, selected by the board of supervisors, from each of the following counties: Butte, Colusa, Glenn, Shasta, Sutter, and Tehama, provided that the county designates a board member to serve on the advisory council.

(d) Three persons, appointed by the Director of Fish and Game, who shall represent, respectively, commercial fishermen, recreational fishermen, and general wildlife and conservation interests. The Director of Fish and Game shall also appoint a representative of county government from a county not represented pursuant to subdivision (c) which contains a commercial fishing industry dependent on the upper Sacramento River. This person shall represent the commercial fishing industry interests of the San Francisco Bay area and north coast.

(e) One person, appointed by the Director of Forestry, who shall represent commercial timber operators.

(f) One person, appointed by the Director of Food and Agriculture, who shall represent agricultural interests and is a riparian landowner.

(g) A representative of the Sacramento River Water Contractors Association, provided that the representative agrees to serve on the advisory council.

1403. The Upper Sacramento River Fisheries and Riparian Habitat Action Team shall consist of one person designated by each member of the advisory council, except that the Chairperson of the California Regional Water Quality Control Board for the Central Valley Region shall designate one member and the Chairperson of the State Water Resources Control Board shall not designate a member and except that the members of the advisory council appointed pursuant to subdivisions (d), (e), and (f) of Section 1402 shall themselves serve on the action team.

1404. The advisory council and the action team shall each select a chairperson from its members by majority vote.

1405. Members of the advisory council and the action team shall serve without compensation.

1406. The advisory council shall develop the Upper Sacramento River Fisheries and Riparian Habitat Management Plan, including a proposed implementation program, for submission to the Legislature. The management plan shall provide for the protection, restoration, and enhancement of fish and riparian habitat and associated wildlife. The management plan shall establish a series of priority actions with specified time frames, estimated costs and benefits, and proposed funding sources.

The action team and the advisory council shall consider and may incorporate into the management plan, where feasible, the findings and recommendations of studies conducted by the Department of Water Resources pursuant to Section 238 of the Water Code.

1407. The area of study of the management plan shall be the Sacramento River and tributary streams, and associated riparian habitat, upstream from the confluence with the Feather River and downstream from Keswick Dam.

1408. The action team shall serve as a working group to develop proposed plan elements. The action team shall submit its recommendations to the advisory council for its review and approval. The advisory council shall be responsible for the management plan submitted to the Legislature.

1409. The Secretary of the Resources Agency shall appoint a project manager to supervise plan preparation and to coordinate activities of the advisory council and the action team.

1410. The advisory council shall hold at least two public hearings in separate counties within the area of study prior to final approval of the management plan. The action team shall hold at least one workshop, open to the public, in each of the counties represented on the advisory council pursuant to subdivision (c) of Section 1402.

1411. The advisory council shall submit the management plan, including a proposed implementation program, to the Legislature not later than January 1, 1989.

1412. This chapter shall not delay or preclude any current, pending, planned, or proposed fisheries and wildlife protection enhancement, restoration, or acquisition activities or bank protection, flood control, irrigation, or other management activities along the upper Sacramento River.

1413. This chapter shall remain in effect only until January 1, 1989, and as of that date is repealed, unless a later enacted statute, which is enacted before January 1, 1989, repeals or extends that date.

SEC. 3. The sum of two hundred fifty thousand dollars ($250,000) is hereby appropriated from the California Environmental License Plate Fund for expenditure in accordance with the following schedule:

(a) One hundred fifty thousand dollars ($150,000) to the Wildlife Conservation Board for the purposes of Article 4.5 (commencing with Section 1385) of Chapter 4 of Division 2 of the Fish and Game Code.

(b) One hundred thousand dollars ($100,000) to the Secretary of the Resources Agency for preparation of the Upper Sacramento River Fisheries and Riparian Habitat Management Plan pursuant to Chapter 4.5 (commencing with Section 1400) of Division 2 of the Fish and Game Code.

Senate Concurrent Resolution No. 62

RESOLUTION CHAPTER 173

Senate Concurrent Resolution No. 62—Relative to the Sacramento River.

[Filed with Secretary of State September 21, 1989.]

LEGISLATIVE COUNSEL'S DIGEST

SCR 62, Nielsen. Sacramento River: Upper Sacramento River Fisheries and Riparian Habitat Management Plan.

This measure would declare that it is the policy of the State of California to implement the actions recommended in the Upper Sacramento Fisheries and Riparian Habitat Management Plan, as specified. The measure would request the Secretary of the Resources Agency to establish, for a 2-year period of service, an Upper Sacramento River Advisory Council, as prescribed.

WHEREAS, The Sacramento River system has tremendous social, environmental, and economic value to the people of California for many consumptive and nonconsumptive beneficial purposes; and

WHEREAS, The Sacramento River system is the largest source of salmon, striped bass, sturgeon, and shad in the state, and is also a
major source of steelhead and other game fish; and

WHEREAS, The Sacramento River system is the source of water for much of the migratory bird population of the Pacific Flyway; and

WHEREAS, Various human and natural causes have contributed to substantial reductions in various anadromous fish populations in the Sacramento River system; and

WHEREAS, The California Legislature enacted legislation in 1986 which created an action team and an advisory council representing diverse interests to develop an Upper Sacramento Fisheries and Riparian Habitat Management Plan; and

WHEREAS, The advisory council completed and submitted a management plan to the Legislature in January of this year; and

WHEREAS, The plan identified specific actions necessary to protect, restore, and enhance the fisheries and riparian habitat and associated wildlife as part of the orderly development of the water resources of the Sacramento River Basin; now, therefore, be it

Resolved by the Senate of the State of California, the Assembly thereof concurring, That it is the policy of the state to implement the actions recommended in the Upper Sacramento River Fisheries and Riparian Habitat Management Plan in general conformance with the priorities indicated in the plan; and be it further

Resolved, That it is the policy of the state to appropriate sufficient funds annually, in conjunction with the federal government, local governments, and other sources, to implement the actions outlined in the management plan; and be it further

Resolved, That it is the policy of the state that departments, agencies, and other units of the state with responsibilities for implementation of the plan, shall upon adoption of this resolution, proceed with implementation measures that are authorized under existing law or as may be authorized in the future; and be it further

Resolved, That it is the policy of the state to encourage the federal government, local governments, and other organizations and individuals to proceed with their responsibilities to implement the actions outlined in the management plan; and be it further

Resolved, That the Secretary of the Resources Agency is hereby requested to establish, for a 2-year period of service, a multidisciplinary Upper Sacramento River Advisory Council, as recommended in the management plan, to review progress on the overall plan as it is implemented and to make annual recommendations on priorities and schedules to the Legislature and the United States Congress, as project actions are undertaken; and be it further

Resolved, That the Secretary of the Senate transmit a copy of this resolution to the Secretary of the Resources Agency.

Report on Costs

SACRAMENTO RIVER
CONSERVATION AREA
c/o CALIFORNIA DEPARTMENT OF WATER RESOURCES
2440 MAIN STREET
RED BLUFF, CALIFORNIA 96080
www.sacramentoriver.ca.gov
Denny Bungarz, Advisory Council Chair • (530) 934-7342 • dbungarz@glenncounty.net
Burt Bundy, Coordinator • (530) 528-7411 • bundy@water.ca.gov

December 8, 1999

Mr. Denny Bungarz, Chair
Sacramento River Advisory Council
526 West Sycamore Street
Willows, California 95988

Dear Mr. Bungarz:

Enclosed please find the *Riparian Habitat Committee Report on Costs of Easements, Acquisitions, Restoration and Bank Protection along the Sacramento River*.

At the March 10, 1999 meeting of the SB1086 Riparian Habitat Committee's management subcommittee, I was asked to work with the California Department of Water Resources Northern District to gather general cost estimates for several riparian habitat management tools that are outlined in the *Handbook*, and to develop a map of a "hypothetical river bend" showing how and where such tools might be used. These tools include bank protection, easements (including a "set-aside" program), acquisition and both active (cultivated) and passive (natural recruitment) restoration. The report is to be included as Appendix G in the *Sacramento River Conservation Area Handbook*, and is referred to in the Memorandum of Agreement Regarding the Sacramento River Conservation Area.

This report provides general information only. The cost of land and easement acquisitions are based on recent sales. Details on these sails can be obtained from SB1086 staff at DWR.

The Riparian Habitat Committee reviewed a draft of this report in subcommittee on June 15, 1999, and at its July 14, 1999 regular meeting. The attached report includes changes and comments made during those meetings.

We hope that this report will provide stakeholders with a better understanding of costs associated with riparian habitat restoration conducted under a Sacramento River Conservation Area Program, as well as a useful starting point for site-specific planning and project implementation.

Sincerely,

Burt Bundy
Sacramento River Conservation Area Coordinator

Report on Costs of Easements, Acquisitions, Restoration and Bank Protection within the Sacramento River Conservation Area

by the
SB1086 Advisory Council
Riparian Habitat Committee
and the
Sacramento River Conservation Area Coordinator

December 15, 1999

Introduction

The Sacramento River Conservation Area Handbook describes several tools available to restore and protect a continuous riparian corridor along the river. These include bank protection, easements (including a "set-aside" program), acquisition and both active (cultivated) and passive (natural recruitment) restoration. This report provides general cost estimates for each tool under various conditions (Table 1). In addition, the report provides an example of how and where such tools might be used on a hypothetical river bend (Figure 1).

The purpose of this report is to illustrate how the Sacramento River Conservation Area program would use restoration and management tools, and to illustrate the approximate proportion of funding that may be required for various aspects of a site-specific management plan.

To obtain background information, telephone interviews were held with people from a variety of organizations and agencies that currently use these tools. The basis for the actual cost estimates varies by tool. Land and easement acquisition costs are based on recent sales. These were compared with listing prices on the Internet and in the newspaper. Bank protection costs are based on discussions with two ranch managers, and on data provided by the U.S. Army Corps of Engineers (USACE). Set aside costs are based on rental rates for various crops. Restoration costs are based on estimates provided by two nonprofit restoration organizations. Each tool has a high degree of cost variation, as described below. Each section of the river is unique, and the cost of each of the implementation tools varies with the circumstances.

This report does not cite specific sources, because the Riparian Habitat Committee is concerned about protecting their privacy. However, source information can be obtained from 1086 staff at the Department of Water Resources, Northern District office.

Bank Protection

The Sacramento River Conservation Area program may use bank protection to achieve its goals, as described in the Handbook on page 9-6. The cost of both private and public bank protection along the Sacramento River is examined. Two river ranch managers in Tehama County with recent experience installing bank protection provided information on private costs, which ranged between $150 and $450 per linear foot. Cost depends on the height and slope of the bank, which alters the amount of rock needed per linear foot. Cost also depends on the environmental mitigation factors, including obtaining permits, working at night, and working around trees.

The USACE installs all of the publicly funded bank protection on the Sacramento River, under several authorities:

- Sacramento River Bank Protection Project (SRBPP), for purposes of protecting the proper functioning of the Sacramento River Flood Control Project;
- Chico Landing to Red Bluff Project, for purposes of preventing siltation downstream and in the delta, and
- Public Law 84-99, for emergency flood control purposes.

Cost of publicly-installed bank protection was obtained from the USACE, Sacramento District. Costs of two bank protection sites, the lower American River, and Steamboat Slough (both installed under SRBPP authority), were considered representative of the current range of costs of bank protection. These projects cost $2,000 and $1,000 per linear foot respectively. However, many of the proposed future sites may be $2,500 or more per linear foot given the high mitigation costs required for these sites.

Cost of installing emergency bank protection under PL 84-99 (such as that installed in Butte County in the winter of 97/98) was not determined.

Trenched rock figures (Figure 1) were based on costs experienced by one landowner who has installed periodically beginning in the late 1980s. His costs have been $85-125 per linear foot, based on a 12'x12' trench filled with free concrete rubble. Costs included digging the trench, filling, and transporting the rubble. No permit costs were incurred on the project.

Acquisition

The Sacramento River Conservation Area Program may use fee title acquisition to achieve its goals, as described in the Handbook on pages 9-6 and 9-7.

Acquisitions for riparian habitat conservation and flood control purposes have been made by private conservation organizations such as The Nature Conservancy (TNC), as well as the U.S. Fish and Wildlife Service (USFWS), the Bureau of Land Management, the Wildlife Conservation Board (WCB)and The Reclamation Board (Rec Board).

Cost estimates are based on actual sales of properties to the USFWS and two nonprofit land restoration organizations that work on the Sacramento River. Costs were compared with Internet and classified listings of land for sale on or near the Sacramento River. Acquisition prices were divided into land use type, with walnut orchards ranging between $6,000 and $10,000 per acre, almond and prune orchards ranging between $4,500 and $7,500 per acre, non-irrigated crops (grainland) ranging between $2,000 and $3,000 per acre, irrigated row crops ranging between $2,500 and $3,500 per acre, existing riparian habitat ranging between $800 and $1,200 per acre, and gravel bars ranging between $500 and $800 per acre. Reasons for variation in costs for each land use type include condition of the land, production records and location of the property.

Conservation Easements

The Sacramento River Conservation Area program may use conservation easements and set-aside agreements to achieve its goals, as described in the Handbook on pages 9-4 through 9-6.

Both agricultural conservation and riparian conservation easements have been purchased by the WCB, The Rec Board, and TNC. Riparian conservation easements are deeded easements that have significant restrictions on land use, including prohibition of development for agricultural, residential, commercial and industrial uses, and also limits on such activities as flood control, water use and gravel or mineral

removal. Continued control of hunting and access may be reserved for the landowner.

Agricultural conservation easements are deeded easements that allow agricultural uses, but prohibit residential, commercial, and industrial development. Restrictions as to some crop uses and the incorporation of an integrated pest management (IPM) plan are usually included. Sometimes a "best management practices (BMP)" section is included. All other normal agricultural uses are reserved for the landowner.

Easement costs in this report are based on prices paid by the WCB for three separate conservation easements purchased in 1987, 1993 and 1994. These easements are on both agricultural and riparian land. Prices for easements on agricultural land averaged between $600 and $5,000 per acre, based on an easement in Colusa County at river mile 145. Prices for easements on riparian lands along the Sacramento River ranged between $400 and $900 per acre, based on an easement near Hamilton Bend in Colusa County. Prices for these easements varies greatly depending on current land market values, date of purchase, type and condition of land, and the nature of the restrictions placed on the land in the easement agreement.

A set-aside program is described in the Handbook which would be similar to an easement, but would be a renewable contract with the landowner rather than the outright purchase of an easement. Programs similar to this include the Conservation Reserve Program offered through Natural Resources Conservation Service and a set aside program involving asparagus in the delta, that uses a percentage of average production revenues as a basis for determining annual payment. This method is also used to determine rental rates for cropland. The annual set-aside costs of $50 to $300 per acre in this report are based on rental rates for various crops grown along the Sacramento River.

Restoration

Restoration of riparian forests is part of the overall goal of the Sacramento River Conservation Area Program. Restoration priorities are listed on pages 1-6 - 1-7 of the Handbook.

Restoration is being carried out by local, state and federal agencies and non-profit organizations along the river. The largest efforts are being carried out by TNC, which has restored over 2,000 acres.

Costs of land restoration along the Sacramento River were obtained from two restoration organizations working on the river. Restoration methods on the Sacramento River can be grouped as active (cultivated) or passive (natural recruitment). Passive restoration costs run from negligible amounts to $1,000 per acre, depending on the level of land use and the existing infrastructure. Uses such as farming and gravel mining tend to require minimal restoration, while lands that contain extensive weeds and/or levees that need to be removed require a more intensive and costly restoration. Active restoration costs range from $2,000 to $5,000 per acre and this depends on the intensity of the current land use and the cost to discontinue that use. Controlling weeds, irrigation, and the planting of both over- and understory species all contribute to the high end of the cost range.

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Table 1. Cost Estimates

	Cost Estimate (Low)	Cost Estimate (High))	Factors Affecting Cost Variation
BANK PROTECTION	(per linear foot)	(per linear foot)	
Federal--USACE (Rock)	$1,000	$2,000	bank height, bank slope; environmental factors (e.g. working at night, working around trees obtaining permits, etc.)
Private (Rock)	$150	$450	
Private (Trenched Rock)	$85	$125	cost based on 12'x12' trench, with free concrete rubble fill
CONSERVATION EASEMENTS	(per acre)	(per acre)	
Riparian	$400	$900	market values, date of acquisition, land conditions, land restrictions
Agricultural	$600	$5,000	market values, date of acquisition, land conditions, land restrictions
Setasides	$50	$300	rental prices for various crops
ACQUISITIONS (by land use type)	(per acre)	(per acre)	
Orchard (almond/prune)	$4,500	$7,500	vary with location, soil quality, flood risk, etc.
Orchard (walnut)	$6,000	$10,000	vary with location, soil quality, flood risk, etc.
Non-irrigated Crops (Grainland)	$2,000	$3,000	vary with location, soil quality, flood risk, etc.
Row Crops (irrigated)	$2,500	$3,500	vary with location, soil quality, flood risk, etc.
Existing Riparian	$800	$1,200	vary with location, soil quality, flood risk, etc.
Gravel Bars	$500	$800	vary with location, soil quality, flood risk, etc.
RESTORATION	(per acre)	(per acre)	
Recruitment	$0	$1,000	cost varies greatly due to site-specific issues, such as weed control, levee removal, cost of discontinuing existing uses
Cultivated	$2,000	$5,000	cost varies greatly due to site-specific issues, such as weed control, levee removal, cost of discontinuing existing uses, complexity of planting design, and irrigation and maintenance.

ESTIMATES ARE BASED ON ACTURAL COSTS (1987-1999). SOURCES ARE AVAILABLE FROM DWR NORTHERN DISTRICT.

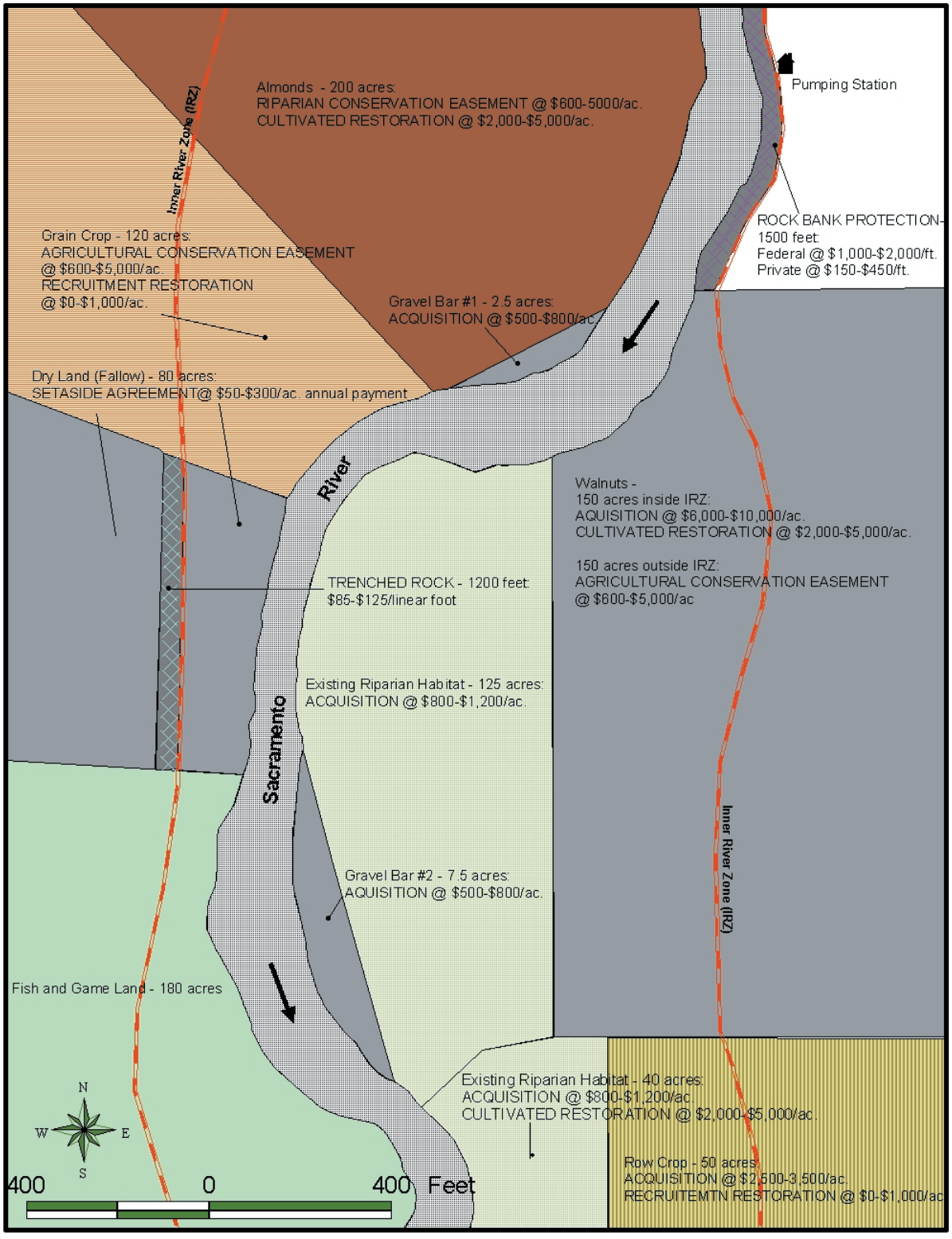

Figure 1. Hypothetical river bend, showing use of some of the tools outlined in the Handbook. Each section of the river is unique and the cost of these actions vary with the circumstances. Estimates are based on actual costs (1987-1999). Sources are available from DWR Northern District.

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M. Kelly & J. Cunningham 12/16/99

AMENDMENT PROCEDURE

HANDBOOK AMENDMENT PROCEDURE

The Sacramento River Conservation Area Handbook is the result of many hours of work by the Riparian Habitat Committee and members of the Department of Water Resources staff. As this is a working document, amending it to keep it up to date and to correct any errors is an essential part of the process.

1. Amendments to the Handbook will be reviewed at least annually, as determined by the Board, at a regularly set amendment review meeting of the Sacramento River Conservation Area Board of Directors.

2. Proposed amendments shall be presented to the SRCA Board in writing. The suggested changes or corrections should indicate the chapter and page affected and be submitted using “strike out ”and “underline ”format. The person or group proposing the change should list the reasons for the amendment and be prepared to address the need for the proposed change at the appropriately scheduled SRCA meeting.

3. Upon receiving a proposed amendment, the SRCA Board will refer it to the Technical Advisory Committee for review and recommendation to the Board. The proposed amendment will also be assigned to the agenda of the next SRCA meeting,after the Technical Committee review, for discussion and possible action. Action may include denial or acceptance of the amendment,or a modification of the amendment,for recommendation to adopt at the amendment review meeting.

4. At least thirty days prior to the scheduled amendment review meeting, the SRCA Board will notify the signatories of the MOA and the members of the Advisory Council of the Board ’s intent to adopt specific Handbook amendments.

5. Amendments to the Handbook will be adopted by a vote of the Board as defined in the MOA.

The changes will be published once each year at a time established by the SRCAF. All adopted changes will be incorporated into the Handbook and sent to all identified Handbook owners. To the extent funding and staff resources allow, DWR will assist the SRCA in publishing and distributing changes to the Handbook.

GLOSSARY

accretion: Sediments carried by a stream and deposited along banks or surrounding areas.

active restoration: Specific, human actions taken to reestablish the natural processes, vegetation and resultant habitat of an ecosystem.

aggrade (aggradation): To raise the channel of a river by depositing sediment and similar materials.

alluvial: Pertaining to clay, silt, sand, gravel or other sedimentary matter deposited by flowing water, usually within a river valley.

anabranch: A channel that branches off from a river (often creating islands), re-joining it further downstream.

anadromous: Pertains to fish species that spend a portion of their life cycle in the ocean, but that migrate to fresh water to spawn.

bank protection: A method of erosion control in which materials (usually rock revetment) are placed along the banks of a river in order to prevent encroachment on adjacent land.

bank stabilization: The prevention of channel migration through bank protection.

basin: An area drained by a river and its tributaries.

bottomlands: The low alluvial lands next to a river.

Central Valley Project (CVP): Agricultural water supply system that is operated and maintained by the Federal Bureau of Reclamation; water from the Sacramento River is captured and conveyed from Lake Shasta to the San Joaquin Valley.

channel migration: The lateral movement of a river channel as it adjusts to balance erosion with deposition.

channel: The space above the bed and between the banks occupied by a natural or artificial waterway that confines water.

chute cutoff: A channel that connects the converging areas of a meander bend; a chute cutoff creates an oxbow lake from an existing meander bend.

conservation easement: Legally binding restrictions that landowners voluntarily place on their properties that bind present and future owners; these restrictions limit certain rights and uses of the property for conservation, preservation or restoration purposes.

degrade (degradation): Opposite of aggrade (aggradation); to erode or deepen a river channel.

designated floodway: The river channel and that portion of the adjoining floodplain required to reasonably provide passage for the 100-year flood (defined by State Reclamation Board).

distributary: A branch of a river that flows away from the main river channel with-out rejoining it.

ecosystem: A community of different species interacting with one another and their environment.

endangered species: A species with so few surviving individuals that it is in danger of becoming extinct.

ephemeral: Lasting a short time; a stream that does not flow year round.

extirpation: Local extinction or complete disappearance of a species from a region.

floodplain: The relatively flat area along the sides of a river which is naturally subject to flooding.

floodway: The river zone that could theoretically (based on surveying data and hydraulic calc-ulations) convey the 100-year flood with only a one-foot rise of water level above the height of the unconstricted flood; construction is generally prohibited in these areas.

fluvial: Pertaining to a river.

forb: An herb that is not considered to be a grass or grasslike.

geomorphology: The study of the origins, processes and characteristics of land-forms.

habitat: The environment of a plant or animal species.

hard points: Structures located adjacent to a river, such as buildings, bridges or levees, that change the direction or rate of channel migration by interfering with the river's movement.

hydrology: The science concerned with the properties, distributions and characteristics of the water in relation to the earth.

incidental take: The loss or harassment of a listed species or degradation of their habitat incidental to an otherwise lawful activity.

inner river zone: The estimated portion of river alluvium that has experienced river channel migration in the recent past and is likely to experience channel movement in the near future; the area includes the 100-year meanderbelt and areas of projected bank erosion over the next fifty years.

lagoon: Any small, pond-like body of water that may or may not be connected to a larger body of water.

levee: An embankment designed to prevent the flooding of a river; may be natural or human made.

levee toe: The outer edge of the levee base where it meets the levee grade.

limited meander: Allowing for river channel migration within a defined area.

marshlands: Wet areas of land dominated by typical wetland species, such as grasses and tule or cattails.

meander*:* The bend or curve in a river or stream channel. Also refers to the migration of the river or stream channel.

meander scar: The area of land marked by the earlier presence of a meandering river channel.

mitigation: An action designed to avoid, minimize, reduce or compensate for a significant impact to the environment.

natural levee: naturally occurring deposits along the sides of a river that constrain frequent floods.

neotropical migrants: Species, typically birds, that migrate to and from the tropical regions of North America, South America and the West Indies.

non-point source pollution: Water pollution deriving from a broad area rather than a specific place; for example, urban and agricultural runoff may contain non-point source pollutants.

one-hundred-year floodplain: The relatively flat portion of the river channel that has a one percent chance of being inundated by flood waters in any given year.

one-hundred-year meanderbelt: The area of land over which a river channel has historically migrated over a 100-year period.

oxbow lake: A horseshoe-shaped lake formed in an abandoned meander bend of a river.

passive restoration: Allowing a river system to restore its natural vegetation and processes without human help or interference (opposite of active restoration).

phreatophyte: Plant that draws water from saturated soils typically found in river floodplain

reforestation: The replanting of trees in an area that was previously forested.

regulated floodway: The channel of a river or other watercourse and the adjacent land areas that must be reserved for the discharge of the base flood without cumulatively increasing the water surface elevation by more than one foot.

restoration: The return of an ecosystem to an approximation of its former unimpaired condition.

riparian: Pertaining to the banks of a stream, such as riparian woodland or riparian vegetation.

riparian habitat: An area composed of native riparian vegetation that provides habitat for wildlife.

riparian corridor: A band of native riparian vegetation, or frequently flooded land, of variable width, adjacent to a river channel.

river gradient: The slope of a river's water surface profile.

rock revetment: A layer of rock designed to protect a river embankment.

Sacramento River Conservation Area (SRCA): The 222 miles of the Sacramento River and the adjacent 77,155 acres of land extending from Keswick Dam in Shasta County south to the town of Verona in Sutter County.

Senate Bill 1086 (SB 1086): Legislation authored by Senator Jim Nielsen that authorized the formation of the SB1086 Advisory Council to oversee issues related to the Sacramento River.

sensitive species: A plant or animal species listed by the state or federal government as threatened, endangered or as a species of special concern. SEE ALSO: threatened species, endangered species.

seral stages: Ecological communities that succeed one another in the biotic development of an area.

set-aside agreements: Short-term (5-year minimum) restrictions self-imposed by landowners that bind present as well as future owners, that enables land management with minimum interference; a contract, generally including the same types of conditions found in conservation easements, however, landowners could reserve the right to conduct limited agricultural and non-commercial activities within the set-aside area.

set-back levee: Levees that are constructed at a distance from the river channel in order to allow the river to occupy a portion of its floodplain; these levees are usually smaller in size than levees placed immediately adjacent to the river channel. SEE ALSO: levee, natural levee.

sinuous: Having many curves, bends or turns, such as a meandering river.

slough: A naturally occurring side or overflow channel that holds water.

snag*:* A dead tree or part of a tree, such as a stump, located in a river channel

State Water Project (SWP): The water storage and conveyance system that is operated and maintained by the California Department of Water Resources.

subreach: A general term used to describe a portion of a river reach.

succession: The replacement of one plant community by another over time.

threatened species: A species that is still abundant in its natural range but may become endangered if it declines in number.

trenched rock: A method of erosion control accomplished by burying rock or structural fill in an area set back from the main river channel; similar to windrowed rock.

tributary: A stream or body of water that flows into a larger body of water, such as a larger river.

understory: Underlying, low vegetation often including shrubs, small trees, grasses and forbs.

Upper Sacramento River Fisheries and Riparian Management Plan: Plan completed in 1989 by the SB1086 Advisory Council which recommends specific actions to be taken on the Sacramento River to restore fisheries and riparian habitat.

watershed: The total area above a given point on a watercourse that contributes water to its flow; the entire area from which a river receives its water supply. Also referred to as catchment or catchment basin.

weir: A notch or depression in a dam or other water barrier through which the flow of water is either measured or regulated.

wetland: Lands that are transitional between terrestrial and aquatic systems where water is usually at or near the surface or the land is covered by shallow water (typically streams, lakes and the open ocean).

windrowed rock: A method of erosion control where rock is piled in an area where the channel is likely to erode; theoretically, when erosion reaches the windrow, the rock will fall along the bank, increasing its stability; similar to trenched rock.

Appendix I "Issues To Be Resolved" has been deleted from the 2002 Handbook.

MEMORANDUM OF AGREEMENT

MEMORANDUM OF AGREEMENT
REGARDING THE SACRAMENTO RIVER CONSERVATION AREA

I. Preamble

Background

In 1986, the California State Legislature passed Senate Bill 1086. The law called for development of a management plan for the Sacramento River and its tributaries to protect, restore, and enhance both fisheries and riparian habitat.

The law created an Advisory Council, composed of representatives of state and federal agencies, county supervisors, and landowner, water contractor, commercial and sport fishery, and general wildlife and conservation representatives. The Council and its action teams developed a plan which included a specific and action-oriented fisheries plan, and a more conceptual riparian habitat plan. This plan, the Upper Sacramento River Fisheries and Riparian Habitat Management Plan, was published by the State of California Resources Agency in 1989 *(1989 Pla*n).

Many of the fisheries action items have since been or are currently being implemented, such as fish bypass structures at diversions on Sacramento River tributaries, and the Shasta Dam temperature control structure. A Riparian Habitat Committee was created in 1993, when the Advisory Council was reconvened by the Secretary of Resources to "complete its earlier work concerning riparian habitat protection and management, including the development of a specific implementation program."

The Riparian Habitat Committee is an informal and consensus-based planning group. It includes landowner representatives, environmental group leaders, and agency personnel who are working toward on-the-ground implementation of the *1989 Pla*n. They have developed *The Sacramento River Conservation Area Handbook (Handbook)* as a guide for riparian habitat management along the Sacramento River. The Committee has worked to ensure that the Handbook addresses both the dynamics of riparian ecosystems as well as the realities of local agricultural economies.

Through the work of the Riparian Habitat Committee, the Advisory Council proposes the formation of a largely locally-based nonprofit entity to coordinate implementation of the riparian habitat management and restorations goals and objectives of the 1989 Plan and Handbook. Actions implemented by the nonprofit should also be coordinated with the Central Valley Project Improvement Act, the CALFED Bay-Delta Program, and the U.S. Army Corps of

Engineers Sacramento-San Joaquin Basins Comprehensive Study, and other ongoing related activities. The work of this nonprofit organization would be supported by the various agencies and organizations interested in the Sacramento River through this Memorandum of Agreement (MOA).

Goal of the Sacramento River Conservation Area Program

The goal of the Sacramento River Conservation Area Program as outlined in the *1989 Plan* is "to preserve remaining riparian habitat and reestablish a continuous riparian ecosystem along the Sacramento River between Chico and Redding, and reestablish riparian vegetation along the River from Verona to Chico." The goal will be met in a manner that follows these six guiding principles:

- Utilizes an ecosystem approach that contributes to recovery of threatened and endangered species and is sustainable by natural processes;
- Uses the most effective and least environmentally damaging bank protection techniques to maintain a limited meander, where appropriate;
- Operates within the parameters of local, state and federal flood control and bank protection programs;
- Encourages participation by private landowners and affected local entities that is voluntary, never mandatory;
- Gives full consideration to landowner, public and local government concerns;
- Provides for the accurate and accessible information and education that is key to sound resource management.

II. Purpose of MOA and Disclaimers

The purpose of this MOA is to:

A. Document broad endorsement by the signatories of the decisions and recommendations made by the Advisory Council embodied in the *1989Pla*n.

B. Document signatory commitment to support the goals, six principles and *Handboo*k.

C. Improve coordination and cooperation between public agencies in the implementation of the *1989 Plan* and *Handboo*k.

D. Identify the agreements of the signatories and relationships among the signatories and the new nonprofit organization (NPO) in implementing the *1989 Plan* and *Handboo*k.

E. Document signatory support of the establishment of a NPO as described in *Goal, Role and Structure of a Nonprofit Organization* (Attachment A).

F. Identify the role and responsibilities of the NPO as detailed in Attachment A.

Disclaimers

A. Nothing in this MOA is intended to expand or limit the legal authority of any signatory, agency, entity or organization. This document does not modify or supersede other existing agreements, programs, MOUs, plans, regulations or executive orders.

B. Nothing herein alters the existing authorities or responsibilities of any party nor shall be considered as obligating any party in the expenditure of funds or the future payment of money or providing services.

C. This MOA is intended to embody general principles, and does not create contractual relationships, rights, obligations, duties or remedies between or among signatories.

D. All activities implemented by the NPO under the *1989 Plan* and *Handboo*k, including site specific agreements, will be in compliance with all applicable existing and future local, state, and federal laws and regulations.

E. The signatories acknowledge that the California Environmental Quality Act requires consideration of the environmental consequences of an activity as early as feasible in the planning process to enable environmental considerations to influence project program and design. All activities implemented under the *1989 Plan* and *Handbook* will comply with CEQA and the National Environmental Policy Act (NEPA) on a site-specific basis. The signatories will also consider the appropriateness and potential benefits of programmatic approaches to CEQA and NEPA compliance.

III. Relationship between Signatories and Nonprofit Organization

A. We will support the NPO in implementing the *1989 Plan* and *Handboo*k, and will work with the NPO on specific projects. We will maximize coordination and consistency of policies and programs with the *1989 Plan* and *Handboo*k.

B. We will assist the NPO in identifying and obtaining funding sources for the activities of the NPO including, but not limited to, a voluntary land transaction or management program. This program may include activities such as development of site specific land management plans within the inner zone; bank stabilization that is consistent with the 1989 Plan and Handbook; re-vegetation of levees and other areas where natural revegetation will not occur; and control of trespass and vandalism.

C. We will coordinate with the NPO in the land management planning process for lands within the Conservation Area delineated in the Handbook.

D. We will coordinate with the NPO when acquiring lands within the Conservation Area delineated in the Handbook.

E. We will conduct land management practices on public lands within the Sacramento River Conservation Area in a manner that is consistent with the 1989 Plan and Handbook.

F. We may contract with the NPO.

G. Signatories will work with the NPO to develop a streamlined/ coordinated permit process for individual project agreements.

H. Appropriate signatories will participate in a technical advisory committee for the NPO. They will assist the NPO with technical information on issues such as erosion/deposition data, flood control activities, and habitat protection and restoration methods and programs.

I. Appropriate signatories will work with the NPO to coordinate and maximize law enforcement activities regarding trespass and vandalism along the river and for participating properties within the Conservation Area on both private and public lands.

IV. General Agreements

A. We endorse the goals of the 1989 Plan.

B. We agree to the goals, six principles, and Handbook.

C. We agree to maximize coordination and consistency of the programs and policies of our agencies with the goals, and management objectives in the 1989 Plan and Handbook.

D. We agree to recognize the proposed Conservation Area as delineated and described in the Handbook.

E. We recommend and agree to the creation of a NPO as detailed in Attachment A. The NPO will oversee implementation of the goals and restoration priorities stated in the 1989 Plan and Handbook.

F. We agree that any potential breach of the inner zone boundary will be addressed quickly and with our full cooperation. The manner in which the breach will be addressed will depend on the specific site, and may range from the placement of rock or other appropriate material to the acquisition of land.

V. Amendment Process

This MOA may be supplemented, amended, or modified by the written agreement thereto of the signatories.

VI. Signatories

NOTE: Support for this MOA will be solicited and welcomed from each of the governments and agencies below. After signing the MOA, each county participant will appoint two representatives to the board of directors of the proposed nonprofit organization. The participation of four counties is required to ensure a large enough initial board. Italics indicate those state governments and agencies from whom signed support is critical for the success of the program.

Butte County
Colusa County
Glenn County
Shasta County
Sutter County
Tehama County
Yolo County
California Resources Agency
California Department of Fish and Game
Wildlife Conservation Board
California Department of Water Resources
California Department of Parks and Recreation
California Water Commission
The Reclamation Board
California State Lands Commission
California Department of Food and Agriculture
United States Army Corps of Engineers
United States Army Corps of Engineers
United States Bureau of Reclamation
United States Fish and Wildlife Service
United States Natural Resource Conservation Service

National Marine Fisheries Service
City of Redding
City of Anderson
City of Red Bluff
City of Tehama
City of Colusa
California Environmental Protection Agency
California Department of Forestry and Fire Protection
California Department of Boating and Waterways
California Department of Conservation
Special Districts (e.g. reclamation, flood control, irrigation districts etc.)
State Water Resources Control Board
Central Valley Regional Water Quality Control Board
United States Environmental Protection Agency
United States Bureau of Land Management
United States Forest Service

In addition to signed support from the above governments and agencies, endorsements will be sought from the following programs and organizations:

Audubon Society
CALFED Bay Delta Program
California Cattlemen's Association
California Farm Bureau Federation
Central Valley Habitat Joint Venture
California Waterfowl Association
CalTrout
Central Valley Flood Control Association
Ducks Unlimited
Family Water Alliance
Friends of the River
The Nature Conservancy
Northern California Water Association
Pacific Coast Federation of Fishermen's Associations
Planning and Conservation League
Riparian Habitat Joint Venture
Sacramento River Discovery Center
Sacramento River Partners
Sacramento River Preservation Trust
Sacramento River Watershed Program
Sacramento Valley Landowners Association
Society for Ecological Restoration, California Chapter
Trust for Public Lands
United Anglers of California

MEMORANDUM OF AGREEMENT
REGARDING THE SACRAMENTO RIVER CONSERVATION AREA

ATTACHMENT A
Goal, Role and Structure of a Nonprofit Organization

VI. Goal

The SB 1086 Advisory Council recommends the creation of a local nonprofit organization (NPO) to implement a Sacramento River Conservation Area Program as described in the Upper Sacramento River Fisheries and Riparian Habitat Management Plan (1989 Plan) and the Sacramento River Conservation Area Handbook (Handbook).

The goal of the NPO and the Sacramento River Conservation Area Program is to preserve remaining riparian habitat and reestablish a continuous riparian ecosystem along the Sacramento River between Chico and Redding, and reestablish riparian vegetation along the river from Verona to Chico. The goal will be met in a manner that follows these six guiding principles:

- Utilizes an ecosystem approach that contributes to recovery of threatened and endangered species and is sustainable by natural processes;
- Uses the most effective and least environmentally damaging bank protection techniques to maintain a limited meander, where appropriate;
- Operates within the parameters of local, state and federal flood control and bank protection programs;
- Encourages participation by private landowners and affected local entities that is voluntary, never mandatory;
- Gives full consideration to landowner, public and local government concerns;
- Provides for the accurate and accessible information and education that is key to sound resource management.

The following outlines the role and structure of the NPO.

II. Role

Numerous factors were identified as being critical in the creation of a management entity to implement the *1989 Plan* and *Handboo*k. These responsibilities and factors, listed and described below, provide the basis for outlining the role of the NPO.

- Enhanced Communication
- Coordination and Consistency
- Voluntary Land Transactions
- Riparian Habitat Restoration
- Flood Management
- Land Management
- Limiting River Meander (including Bank Stabilization)
- Mitigation
- Public Information and Technical Assistance
- Public Safety and Law Enforcement on Public and Private Lands
- Monitoring and Research
- Funding Sources and Financial Authority

Enhanced Communication. The NPO will provide a forum to enhance communication among the numerous agencies and interests along the river. The NPO will serve as a liaison between landowners, conservationists and local, state and federal agencies. The NPO will assist with conflict resolution regarding property management issues, and will facilitate timely distribution of information regarding permitting and regulations.

Coordination and Consistency. The NPO will work with public and private entities (individual landowners and non-governmental organizations) to maximize coordination and consistency of policies and programs with the *1989 Plan* and *Handboo*k, to the extent allowable by law and agency mandates.

Examples of policies and programs needing increased coordination and consistency include:

- integration of non-governmental, federal, state or landowner acquisitions made to implement the 1989 Plan (e.g. federal refuges, State ecological reserves, conservation easements, State wildlife areas, mitigation bank sites);

- mitigation banking;

- agreements to establish consistent mitigation guidelines, to the extent allowable by law and agency mandates;

- consolidation of permit application forms;

- development of programmatic or master permits for a region or repeated activity;

- development of long-term permits, and/or authorizations;

- coordination with County general plans;

Some of the tools available to the NPO to maximize coordination and consistency include:

- direct input from state and federal agencies represented on the NPO

governing board as nonvoting members and agency staff acting as technical advisors to the NPO;

- contracts and agreements (such as conservation easements or set-aside arrangements) on individual properties which contain enforcement provisions if the contract is violated by either party; and

- When appropriate, development of regional habitat conservation plans pursuant to applicable laws.

Voluntary Land Transactions. The NPO will have the authority to buy and sell land and conduct or engage in other land transactions or agreements with willing participants consistent with the goals of the *1989 Plan* and *Handboo*k. These activities may include full fee acquisition, conservation easements, set- aside agreements, land trades, private donations, land management contracts, mitigation banks, and transfer of development credits. The NPO will work closely with local landowners to facilitate mutually agreeable land protection arrangements, and will be able to act quickly to protect lands and compensate landowners, as appropriate.

Signatory agencies and the NPO will cooperate to identify and obtain funding to support a voluntary land transaction program. Funding could be provided to the NPO to carry out the transactions or the agencies could contract with the NPO to carry out the program.

Riparian Habitat Restoration. The NPO will facilitate and carry out riparian habitat restoration as part of the site - specific planning process. Evaluation of restoration projects within the inner river zone must follow the six guiding principles of the program. The site should then be assessed using the basic principles, management guidelines and restoration priorities described in the Handbook Chapter 1:

1. Protect physical process where still intact.
2. Allow riparian forests to reach maturity.
3. Restore physical and successional process.
4. Conduct reforestation activities.

By focusing on river process, the priorities are designed so that projects are carried out in a manner consistent with the guiding principle on ecosystem management. They are listed in order of their significance to ecosystem management of the Sacramento River and its floodplain.

Flood Management. While it will not have any legal flood control authorities, the NPO will be in a unique position to provide effective support for actions that:

- maintain proper functioning of flood protection works, and

- are consistent with the goals and principles outlined in the *1989 Plan* and *Handboo*k.

The NPO will be able to assist landowners in obtaining site specific approvals, assisting project sponsors and regulatory agencies in identifying individuals or entities interested in establishing mitigation banks, assisting in the establishment of such banks, and identifying efficient practices that will minimize the cost and/or acreage of mitigation needed. As a non-regulatory, but interested party, the NPO will be able to monitor progress toward riparian habitat restoration goals, and present an assessment of that progress to local decision makers.

The roles of the NPO in regard to flood protection purposes are to:

- help ensure that flood protection projects accomplish their primary purposes of alleviating flood and erosion damage and protecting lives and property while considering the overall habitat restoration objectives of the *1989 Pla*n;

- maintain communication among all interested parties when it is necessary to maintain and repair levees and flood distribution facilities;

- reduce confusion and delay in obtaining project approvals;

- promote floodplain management and habitat conservation practices that maintain the economic and environmental values of the Sacramento River corridor;

- encourage landowner participation in non-structural flood control methods that are economical;

- facilitate a coordinated funding program for projects, and actively encourage creation of, or access to, new funding sources that will accelerate the implementation of the *1989 Pla*n; and

- support and assist local maintenance authorities on projects consistent with the goals of the *1989 Plan* and *Handboo*k.

Land Management. The NPO and signatory agencies will coordinate land management practices on public and participating private lands to provide for consistency of their practices with the 1989 Plan and Handbook, to the extent allowable by law and agency mandate. The NPO and signatory agencies will cooperate in identifying and obtaining funding sources for land management

activities. Examples of land management activities include: development of site-specific land management plans within the inner zone; bank stabilization that is consistent with the 1989 Plan and Handbook; re-vegetation of levees and other areas where natural re-vegetation will not occur; and control of trespass and vandalism.

The NPO will have the authority to manage lands under three different arrangements:

1) to manage whatever land it acquires;

2) to oversee land management by private landowners if those landowners are under management agreements with the NPO; and

3) to manage lands under contract for other entities such as Department of Fish and Game or The Nature Conservancy. The NPO will work with the various entities to help to co-ordinate the acquisition and management of current and future landholdings in the Conservation Area in order to achieve the objectives of the *1989 Plan* and *Handboo*k.

If an agency is unable to begin or finish a project that is consistent with their land management plan, the NPO can offer to complete such a project with the agency's permission. Once the agency has approved an action by the NPO, the NPO will be allowed to complete that action. Such actions may include the enforcement of conservation easement provisions on mitigation sites.

Limiting River Meander (including bank stabilization). The NPO will assist in securing the appropriate agency to address limiting river meander with in the boundary of the inner river zone as described in the Handbook. Responsibility for maintaining the boundary of the inner zone would be negotiated on a case-by-case basis as part of individual agreements/ contracts.

In some cases, maintaining the inner zone boundary will require bank stabilization. Responsibility for bank stabilization will also be negotiated on a case by case basis as part of agreements/contracts. The NPO may take responsibility for bank stabilization as part of an individual land management agreement, and will be responsible for identifying funding for the work and for ensuring the work is completed as agreed. The Army Corps of Engineers, the Reclamation Board or the Department of Water Resources will act as lead agency for bank stabilization only when it is within the agency's legal authority (such as the Sacramento River Bank Protection Project) and the goals of the 1989 Plan and Handbook.

Funding for bank stabilization could come from a variety of sources such as a funding pool for maintaining the river within the inner zone, river

restoration/habitat fund or flood control funds (see *Handbook* Chapter 9). Under a funding pool, funding for future needs could be created by the establishment of a retainer (a percentage of each project cost) to be placed into a pool for bank stabilization or other activities. This pooled account would provide the property owner with an assurance that river meander beyond an established point would be promptly addressed. The NPO would establish and administer this account and determine its use with the assistance of a technical team.

When bank stabilization is conducted on public and private lands within the Conservation Area, the NPO will actively promote the most effective and least environmentally damaging techniques as per the site specific agreements and/or contracts, and all applicable laws and regulations. The NPO will encourage and promote further research and evaluation of alternative bank stabilization techniques, and promote re-vegetation of levees and rocked areas, where appropriate.

The NPO will also work with the regulatory agencies to adopt, when appropriate, a comprehensive habitat plan for threatened and endangered species which could reduce the impact of Conservation Area projects that are consistent with the 1989 Plan and Handbook.

Mitigation. It is anticipated that implementation of the *1989 Plan* and *Handbook* will provide a net increase in benefits to the environment and to species that currently exist, or may become established in the Conservation Area. Localized or short term impacts may occur, but it is a goal of the NPO that the net environmental benefits will outweigh these adverse habitat impacts and that mitigation of these impacts would be minimized or not required. The NPO will work with regulatory agencies to avoid, minimize or compensate for habitat impacts associated with proposed projects should impacts occur. If mitigation is required, it will be the responsibility of the NPO to work with the regulatory agencies to satisfy the requirements and include the costs as part of the total project cost.

When the NPO is the project proponent, the NPO will be responsible for mitigation, if required, as part of the project unless specific arrangements are made for the landowner to provide mitigation. The NPO will coordinate obtaining permits and/or authorizations as part of the landowner agreement/contracts. If certain project elements, such as bank stabilization, are planned for implementation in the future, the NPO will obtain permits and/or authorizations up front, to the extent possible, to ensure that bank stabilization or other activities can occur as intended, and the landowner and NPO can have certainty that the project can be implemented as was agreed.

Public Information and Technical Assistance. The NPO will provide public information and technical assistance to private and public landowners within the

Conservation Area and to the general public on issues such as erosion and deposition, flood control projects, habitat protection and restoration, public access, and recreation. The NPO will serve as a local information clearing house but will refer technical questions such as emergency flood information and legal or regulatory requirements to the appropriate agency. The NPO will also provide information to the public and local communities regarding the benefits of the Conservation Area and of balancing habitat restoration/protection with agricultural land use/ protection. Increasing local and regional appreciation of the river system will support the goals of the program and may lead to financial support.

Public Safety and Law Enforcement on Public and Private Lands. The NPO will work with the local, state and federal agencies which have public safety and law enforcement authority to coordinate and maximize enforcement activities within the Conservation Area on both private and public lands. The NPO will work with the enforcement agencies to identify and implement methods to maximize existing enforcement resources. The enforcement activities needing additional attention include vandalism and trespassing on public and private lands.

Monitoring and Research. The NPO will monitor and prepare annual reports on the implementation of the riparian management objectives of the *Handbook* and the success of the protection and restoration efforts within the Conservation Area. Monitoring will help guide future restoration/protection actions within the Conservation Area and help support future funding requests for the program.

The NPO will assist the agencies in furthering research priorities as out lined in the *Handbook* (see pages 9-10 and 9-11).

Funding Sources and Financial Authority. To implement the 1989 Plan and Handbook, the NPO will need funding for all the responsibilities listed above, as well as funding for annual administrative support. Local, state, and federal agencies will assist the NPO in identifying existing or new agency authorities and funding sources which can support implementation of the 1989 Plan and Handbook. The NPO will seek funding from federal, state, local sources, and private donations; revenue from leased lands; and land transactions, to support annual administrative costs. The NPO will support agency funding in order to ensure effective technical support from the respective agency representatives. The Advisory Council is opposed to the NPO having local property tax authority; however, local funding could be sought through other means.

In order to attract the participation of private landowners, the NPO, in coordination with involved signatory parties, must take a leadership role in

seeking and supporting the availability of incentives which include some aspect of river engineering such as bank protection placed to ensure that the meander is limited. Because project components associated with engineering and construction are often more expensive than acquisition or active revegetation, it is anticipated that a significant portion of Riparian Conservation funding will be devoted to such project elements.

It is a goal of the NPO to ensure that adequate funding is obtained for necessary bank protection and other engineered construction. The NPO will work closely with signatory parties to distribute funds appropriately among all aspects of river management. Specifically, all parties will work toward a balanced effort to fund bank protection in order to establish a limited meander while maintaining an ecosystem. The NPO will encourage funding for all activities so the balance can be maintained over time. Furthermore, when site-specific project plans include multiple components such as acquisition, active planting, bank stabilization or flood protection, the NPO will review the project plans to ensure that all aspects are accurately represented in the project budget.

For a guideline on funding elements for various aspects of a restoration project, refer to the *1989 Plan and the Riparian Habitat Committee Report on 1999 Costs of Easements, Aquisitions, Restoration and Bank Protection along the Sacramento River* (Appendix J in *Handboo*k).

The annual report of the NPO will include, at a minimum, a summary of activities and expenditures the NPO has supported in the following categories:

1. Landowner incentives, including set asides, easements, levee, bank stabilization, flood control projects construction and maintenance
2. Fee title land acquisition
3. Habitat restoration
4. Administration
5. Trespass
6. Education
7. Reimbursement of taxes to local government

III. Structure

The *1989 Plan* recommended creation of a governing board... "(with a) balanced representation of participating landowners and public interest groups". The Advisory Council supports management entity options that are best able to reflect this board representation. An NPO would provide broad flexibility to create a non-governmental board with both landowner and public interest representation. The Advisory Council recommends the establishment of an NPO with a board of directors that will have up to 15 voting members, and six ex-officio (nonvoting) members.

Appointing the First Board of Directors. To ensure a large enough initial board, a minimum of four participating counties is required.

The County Board of Supervisors of the participating counties in the Conservation Area (Shasta, Tehama, Glenn, Butte, Colusa, Sutter, and Yolo) will appoint up to 14 of the voting members. Each county will appoint one landowner representative and one public interest representative. One voting member will be chosen by the Secretary of the Resources Agency. This "at large" board member shall not serve as a government representative. As additional counties decide to participate (after the initial four), the Supervisors of that new participating county will appoint representatives to serve on an equal basis with those already appointed.

The Ex-officio nonvoting board members will be:

Director, California Department of Fish and Game
Director, California Department of Water Resources
General Manager, Reclamation Board of California
California-Nevada Operations Manager, U.S. Fish and Wildlife Service
District Engineer, Sacramento District, U.S. Army Corps of Engineers
Area Manager, U.S. Bureau of Reclamation

It is expected that the ex-officio board members from state and federal agencies will help increase the visibility of the nonprofit organization and maintain the linkage to state and federal government which in turn will help increase the likelihood of continued state and federal government support in the future.

Criteria for Nominating/Appointing Board Members. Landowner directors must reside on, own, or manage property in the Conservation Area. He/she must have a demonstrated interest in supporting the goals and objectives of the NPO.

Public Interest directors must reside in the county from which he/she is appointed. He/she must have a demonstrated interest in supporting the goals and objectives of the NPO.

Terms. The first board members will serve 2 and 3-year terms as described below. Thereafter the board members will serve 2-year terms.

2-year term--public interest appointees from Shasta, Glenn and Sutter counties, landowner appointees from Tehama, Butte, Colusa and Yolo.

3-year term--landowner appointees from Shasta, Glenn, and Sutter counties, public interest appointees from Tehama, Butte, Colusa, and Yolo.

Agency Technical Advisors. Federal, state, and local agencies with an interest in the Sacramento River will provide technical staff support, upon request and within their existing resources for planning, implementation, and monitoring of the plan. It is expected that the technical support will be from those agencies signing the MOA. Input from technical advisors could be provided individually and/or by forming a technical committee.

Chairperson. The board elects the chairperson who will serve a 1- year term. The Chairperson will alternate between landowner and public interest board members.

Quorum. Initially, a majority of representatives of the participating counties will represent a quorum. A quorum of a fully appointed board shall consist of eight board members. A vote in favor of a motion by eight board members present at a meeting shall constitute the act of the Board as long as those voting in favor include at least three landowner board members and three public interest board members.

Manager/Executive Director. A Manager/Executive Director will be selected by the Board.

Board Meetings. Board meetings will be held in either a central location or will be rotated among different locations within the Conservation Area.

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